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FM NPIC WASHDC
TO RUEOJFA/DIA (DIAXX-2)
RUEOJFA/JCS (JRC)
RUEFHQA/HQ USAF FOR AFNICAD & AFRDRP
RUCSAAA/SAC (DIR)
RUWMDDA/9 SRW (DCI)
RUHHHQA/CINCPAC
RUHHBRA/CINCPACFLT
RUHHABA/CINCPACAF (DIR)
RUHHRGA/CINCUSARPAC
[redacted]
BT
S E C R E T [redacted] CITE NPIC 4565
SUBJECT: EVALUATION OF TECHNICAL OBJECTIVE CAMERA MATERIAL FROM GIANT SCALE MISSION S-040

1. THE NEGATIVES FROM THE TECHNICAL OBJECTIVE CAMERAS WERE DIVIDED LONGITUDINALLY INTO THREE SECTIONS. THE SECTIONS WERE FURTHER DIVIDED AND THE PARTS PROCESSED IN EITHER MX578, 221D OR G4L CHEMISTRY. STANDARD REPRODUCTIONS WERE MADE FROM ALL NEGATIVES.

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REPRESENTATIVE SAMPLES OF THE IMAGERY WHICH INCLUDED CULTURED AND NON CULTURED AREAS WERE USED FOR THE EVALUATION.

2. THE PURPOSE OF THE EVALUATION WAS TO DETERMINE THE SUITABILITY OF THE CHEMISTRIES UNDER OPERATIONAL CONDITIONS AND TO DETERMINE WHETHER PHOTO INTERPRETERS AND PHOTO TECHNOLOGISTS PREFER OR ARE INFLUENCED BY THE VARIATIONS IN THE IMAGERY ASSOCIATED WITH THE PROCESSING OF THE ORIGINAL NEGATIVE.

3. SIX FRAMES WERE SELECTED FOR DETAILED ANALYSIS (53R, 102L, 154R, 274L, 550L AND 627R.) THE NEGATIVES AND REPRODUCTIONS WERE SCRUTINIZED BY TEN TECHNOLOGISTS WHO STATED THEIR PREFERENCE. THEIR PREFERENCES WERE WEIGHTED: 3 POINTS FOR FIRST, 1 POINT FOR SECOND AND A MINUS 1 FOR THIRD (LAST) PLACE. THESE NUMBERS WERE THEN CONVERTED TO A RATIO AND IT IS INDICATED BY THE NUMBER FOLLOWING THE CHEMISTRY USED FOR PROCESSING IN THE FOLLOWING STATISTICAL DATA.

A. WHICH REPRODUCTION PROVIDED
(1) THE PREFERRED CONTRAST?
MX578 - 50, G4L - 47, 221D - 3
(2) THE PREFERRED DENSITY?
MX578 - 51, G4L - 47, 221D - 2
(3) THE BEST RESOLUTION?

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G4L - 44, MX578 - 37, 221D - 19
(4) THE LEAST GRAIN?
G4L - 50, 221D - 35, MX578 - 15
(5) THE BEST OVERALL QUALITY?
G4L - 52, MX578 - 46, 221D - 2

B. WHICH NEGATIVE PROVIDED
(1) THE PREFERRED CONTRAST?
G4L - 39, MX578 - 33, 221D - 28
(2) THE PREFERRED DENSITY:
G4L - 46, 221D - 41, MX578 - 13
(3) THE BEST RESOLUTION?
G4L - 44, MX578 - 25, 221D - 31
(4) THE LEAST GRAIN?

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2.

G4L - 49, 221D - 44, MX578 - 7
(5) THE BEST OVERALL QUALITY?
G4L - 48, 221D - 33, MX578 - 19
4. THE REPRODUCTIONS OF THE SIX FRAMES WERE ALSO ANALYZED BY SIX PHOTO INTERPRETERS WHO NORMALLY EXPLOIT GIANT SCALE MISSIONS. THE RESULTS FOLLOW.
WHICH REPRODUCTION PROVIDED

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PAGE 4 RUEADJU 18 S E C R E T
A. THE PREFERRED CONTRAST?
G4L - 44, MX578 - 39, 221D - 17
B. THE BEST SHADOW DETAILS?
221D - 47, MX578 - 28, G4L - 25
C. THE BEST HIGHLIGHT DETAIL?
G4L - 44, MX578 - 36, 221D - 20
D. THE SHARPEST IMAGERY?
G4L - 50, MX578 - 36, 221D - 14
E. THE BEST OVERALL INFORMATION?
G4L - 49, MX578 - 39, 221D - 14
ALTHOUGH G4L CHEMISTRY APPEARS TO BE THE FAVORITE, IT HAS SERIOUS LIMITATIONS IN LOW CONTRAST AREAS AND ACQUISITIONS AT HIGH ANGLES (25 DEGREES) OF OBLIQUITY. FOUR OF THE SIX FRAMES EVALUATED ARE HIGH CONTRAST (CULTURED) AREAS WHICH UNDOUBTEDLY INFLUENCED THE FINDINGS. EXPOSURE DATA WAS NOT PROVIDED FOR THIS EVALUATION. IT IS ASSUMED THAT THE EXPOSURE WAS NORMAL SINCE THE PORTIONS PROCESSED IN MX578 APPEAR TO HAVE THE SAME DENISITY AND CONTRAST AS TYPICAL GIANT SCALE MISSIONS EMPLOYING THIS SENSOR. THE PROCESSING DATA (SENSITOMETRIC STRIPS AND PROCESSING CURVES) WAS NOT AVAILABLE FOR THE MATERIAL PROCESSED IN 221D. THERE IS A SIGNIFICANT DIFF-

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PAGE 5 RUEADJU 18 S E C R E T
ERENCE IN THE BASE PLUS FOG DENSITY OF THE MATERIAL PROCESSED IN 221D. THIS DENSITY RANGES FROM Ø.15 TO Ø.32 IN THE FRAMES USED IN THIS EVALUATION. THE HIGHEST DENSITY IS ASSOCIATED WITH FRAME 627R AND MAY BE THE INFLUENCING FACTOR AS TO WHY THAT PORTION OF THE FRAME WAS RATED SO HIGH. THE PART OF FRAME 627R PROCESSED IN 221D WAS THE OVERWHELMING FAVORITE (67) IN A COMPOSITE OF ALL SELECTIONS IN THE RAW DATA. THAT PORTION OF THE SAME FRAME PROCESSED IN MX578 WAS THE SECOND CHOICE (24) AND THAT PROCESSED IN G4L WAS LAST (9). THERE IS NO OTHER APPARENT REASON FOR THIS COMPLETE REVERSAL IN CHOICE.
5. THE ONLY CONCLUSION DERIVED BY THE TECHNOLOGISTS IS THAT WHEN USING THIS CAMERA SYSTEM, THE CHOICE OF CHEMISTRY SHOULD BE BASED ON THE TYPE OF TERRAIN (CULTURED OR NONCULTURED) AND THE DEGREE OF OBLIQUITY OF THE ACQUISITIONS. ANY OF THE THREE CHEMISTRIES CAN PROVIDE OPTIMUM RESULTS WHEN THE NEGATIVES ARE PROPERLY EXPOSED. THE VARIATIONS IN PROCESSING DID CAUSE VARIATIONS IN THE IMAGERY AND DID INFLUENCE THE SELECTIONS OF BOTH THE TECHNOLOGISTS AND INTERPRETERS TO VARYING DEGREES BECAUSE OF THE DENSITY AND CONTRAST DIFFERENCES.
6. THE RAW DATA USED TO DEVELOP THE RATIONS IN PARAGRAPHS THREE AND FOUR WILL BE FORWARDED TO DIAXX-2.
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S E C R E T

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